a) providing a reactor having an enclosed process space;

b) positioning a substrate within the process space;

c) introducing a process gas into the process space;

d) coupling energy into the process space from an energy source; and

C2

e) injecting at least one higher diamondoid into the process space, wherein the at least one higher diamondoid nucleates the growth of the diamond film on the substrate.

C3

66. (Amended) The method of claim 61, wherein the at least one higher diamondoid is a substituted higher diamondoid.

C4

77. (Amended) The method of claim 61, wherein the injecting step comprises volatilizing the at least one higher diamondoid by heating such that it sublimes into the gas phase.

78. (Amended) The method of claim 77, wherein the injecting step includes entrainment of the sublimed higher diamondoid in a carrier gas which is introduced into the process chamber.

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83. (Amended) The method of claim 61, wherein the injecting of the at least one higher diamondoid increases the growth rate of the diamond film by a factor of at least two to three times.

84. (Amended) The method of claim 61, wherein the injecting of the at least one higher diamondoid increases the growth rate of the diamond film by at least an order

C5

of magnitude.

85. (Amended) The method of claim 61, wherein the injecting of the at least one higher diamondoid occurs at the beginning of a deposition process.

86. (Amended) The method of claim 61, wherein the injecting of the at least one higher diamondoid occurs during at least part of the growth of the diamond film.

87. (Amended) The method of claim 61, further including the step of selecting a particular higher diamondoid to facilitate the growth of a diamond film having a desired crystalline orientation.

90. (Amended) A diamond film nucleated by at least one higher diamondoid.

91. (Amended) A diamond film nucleated by the steps comprising:

a) providing a reactor having an enclosed process space;

b) positioning a substrate within the process space;

c) introducing a process gas into the process space;

d) coupling energy into the process space from an energy source; and

e) injecting at least one higher diamondoid into the process space, wherein the at least one higher diamondoid nucleates the growth of the diamond film on the substrate.

94. (New) The diamond film of claim 90, wherein the higher diamondoid is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.

95. (New) The diamond film of claim 91, wherein the higher diamondoid is selected from the group consisting of tetramantane, pentamantane, hexamantane, heptamantane, octamantane, nonamantane, decamantane, and undecamantane.